

What is claimed is:

1
1 1. A method for fabricating a SnO₂ gate ISFET
2 device, comprising steps of:

3 providing a semiconductor substrate;

4 forming a virtual gate on the semiconductor
5 substrate to define the gate area of the ISFET;

6 forming a source/drain in the semiconductor
7 substrate beside the virtual gate;

8 removing the virtual gate;

9 forming a SnO₂ gate in the gate area to form an
10 ISFET.

1 2. The method as claimed in claim 1, wherein
2 forming the virtual gate to define the gate area of the
3 ISFET further comprises:

4 rinsing the semiconductor substrate;

5 forming a pad oxide layer on the semiconductor
6 substrate; and

7 removing a portion of the oxide layer to form a
8 virtual gate to define the gate area.

1 3. The method as claimed in claim 2, wherein
2 forming the SnO_2 gate in the gate area comprises:

3 coating a solution comprising $\text{SnCl}_2 \cdot 2\text{H}_2\text{O}$ and ethanol
4 on the surface of the gate oxide layer of the ISFET; and

5 heating the semiconductor substrate to a
6 predetermined temperature for a predetermined time
7 interval.

1 4. The method as claimed in claim 1, wherein
2 forming the source/drain beside the virtual gate further
3 comprises doping the semiconductor substrate by the
4 virtual gate as a mask to form a source/drain.

1 5. The method as claimed in claim 3, wherein the
2 concentration of the solution comprising $\text{SnCl}_2 \cdot 2\text{H}_2\text{O}$ and
3 ethanol is 0.37M.

1 6. The method as claimed in claim 3, wherein the
2 predetermined temperature ranges from 350°C to 400°C .

1 7. The method as claimed in claim 3, wherein the
2 predetermined interval is one hour.

1 8. The method as claimed in claim 1, wherein the
2 thickness of the SnO₂ gate is at least 1000Å.